

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions,
and listings, of claims in the application:

LISTING OF CLAIMS:

1-155. (canceled)

156. (currently amended) A method for manufacturing a stopper capsule by an assembly means, the capsule forming a screw stopper for a container typically designed to contain alcoholic drinks and comprising a bottle with which a neck is provided with an outer thread and a tamper-proof ring, the capsule formed of an insert made of plastic material fixed together and axially with a shell comprising an outer head and a metallic outer skirt with a height H, said outer skirt having at least a substantially cylindrical part with a first height H1, a first diameter D1 adapted to the neck of the said container, and at least a radially expanded part with a second height H2, inscribed in a circle with second diameter D2 greater than first diameter D1, the method comprising the steps of:

forming a blank of ~~the said outer part~~ said shell from a metallic strip material, said blank comprising a skirt with the diameter D1 and a third height H' greater than the height H;

transforming said blank into said shell by making said radially expanded part, wherein said skirt of said blank is locally radially expanded over said second height H2,

wherein said transforming step comprises the sub-steps of

a) placing said blank in a shaping die forming a radial cavity with a profile similar to a profile of said radially expanded part, and

b) introducing an expandable punch in said blank, and

c) axially compressing said expandable punch by an axial displacement of a slide such that said expandable punch radially expands and forces a part of said skirt radially into contact with an inner wall of said radial cavity, said expandable punch having a sloping wall such that the local radial expansion of the expandable punch progressively extends in an axial direction, an initial force of said expandable punch applied upon a bottom part of said blank closest to said outer head.

157. (previously presented) The method according to claim 156, wherein said expandable punch and said radial cavity are configured such that said skirt creeps freely from a side opposite said outer head so as to form, progressively in the axial direction, said radially expanded part without any risk of metal breakage.

158. (previously presented) The method according to claim 157, wherein said skirt creeps freely by way of a progressive blocking of said skirt from said outer head, and a remainder of

said skirt not being blocked in contact with said die by said expandable punch.

159. (currently amended) The method according to claim 156, wherein said expandable punch is formed from an elastomeric material configured to deform under compression from said compressing step, said elastomeric material having a Shore hardness ~~being greater than a value depending on mechanical characteristics and a thickness of the material forming said skirt, such sufficient so that~~ said compression step develops a radial force of said elastomeric material greater than a local resistance of said skirt to deformation by radial expansion.

160. (currently amended) The method according to claim 156, wherein said slide is one of i) metallic ~~and made from and~~ ii) formed of an elastomeric with a hardness greater than a hardness of the expandable punch.

161. (previously presented) The method according to claim 156, wherein said slide has a shoulder with a width equal to at least a thickness E_p of the substantially cylindrical part of said outer skirt, so that said shoulder axially compresses an end of said outer skirt when said slide is at a bottom dead center in order to facilitate said expanded part being forced into contact with the inner wall of said cavity.

162. (previously presented) The method according to claim 156, wherein said expandable punch and said radial cavity are configured such that said radially expanded part and said substantially cylindrical part of said outer skirt have substantially the same thickness E_p .

163. (previously presented) The method according to claim 156, wherein the radial cavity of said shaping die has a geometry configured so as to obtain said radially expanded part with the second height H_2 at least equal to 2 mm and said first diameter D_1 varying from 15 mm to 60 mm.

164. (previously presented) The method according to claim 163, wherein the radial cavity of said shaping die has a geometry configured so as to obtain said radially expanded part with height H_2 varying from 3 to 15 mm, said diameter D_1 varying from 15 mm to 60 mm.

165. (previously presented) The method according to claim 156, wherein said expandable punch and said radial cavity are configured such that a ratio D_2/D_1 varies from 1.02 to 1.15.

166. (previously presented) The method according to claim 165, wherein said expandable punch and said radial cavity are configured such that the ratio D_2/D_1 varies from 1.05 to 1.10.

167. (previously presented) The method according to claim 156, wherein said radial cavity is configured such that said substantially cylindrical part and said expanded part are connected by at least one intermediate part with an average slope equal to $\Delta D / \Delta H$, where ΔD is equal to $D_2 - D_1$ and ΔH is equal to a height of said shell on which said diameter varies from D_1 to D_2 , said slope varying from 0.5 to 2.

168. (previously presented) The method according to claim 156, wherein said radial cavity is configured such that said radially expanded part and said substantially cylindrical part have profiles connected together by a radius of curvature R_2 varying from 1.5 mm to $\Delta D / 2$, where ΔD is equal to $D_2 - D_1$.

169. (previously presented) The method according to claim 156, wherein said radial cavity is configured such that an upper part of said radially expanded part is adjacent to said outer head and an upper part of said radially expended part is adjacent to said substantially cylindrical part of said outer skirt, a profile of said outer head being connected to the profile of said radially expanded part by a radius of curvature R_1 varying from 1.5 mm to 5 mm.

170. (previously presented) The method according to claim 156, wherein said radial cavity is configured such that the profile of said radially expanded part forms a circle over all or part of the height H2.

171. (previously presented) The method according to claim 156, wherein said radial cavity is configured such that said outer skirt forms a surface of revolution over all or part of the height H with a constant radius.

172. (previously presented) The method according to claim 156, wherein said radial cavity is configured such that said radially expanded part has a non-circular section in a plane perpendicular to the axial direction so as to facilitate gripping and manual rotation of said capsule.

173. (previously presented) The method according to claim 156, wherein said radial cavity is configured such that said radially expanded part has a circular section in a plane perpendicular to the axial direction with a plurality of reliefs or indentations formed on said circular section.

174. (previously presented) The method according to claim 156, wherein said radial cavity is configured such that said shell comprises said outer skirt with a cylindrical part comprising

a plurality of low amplitude deformations that can form patterns that contribute to manual gripping of the capsule.

175. (previously presented) The method according to claim 156, further comprising:

assembling an insert to said shell, said insert having an inner skirt, by depositing an adhesive onto said cylindrical part, and then force-fitting said inner skirt into said outer skirt.

176. (previously presented) The method according to claim 156, wherein said slide comprises an elastomeric or rubber lower part with a Shore A hardness greater than a hardness of said expandable punch.

177. (previously presented) The method according to claim 156, wherein said radial cavity is configured such that the profile of said radially expanded part forms a regular polygon with N sides, where N varies from 5 to 18, over all or part of the height H2.

178. (previously presented) The method according to claim 156, wherein said radial cavity is configured such that said outer skirt forms a surface of revolution over all or part of the height H with a variable radius.

179. (previously presented) The method according to claim 156, wherein said radial cavity is configured such that said outer skirt has a symmetry of rotation with angle $360^\circ/N$ where N varies from 4 to 80.

180. (currently amended) The method according to claim 158, wherein said expandable punch is formed from an elastomeric material configured to deform under compression from said compressing step, said elastomeric material having a Shore hardness ~~being greater than a value depending on mechanical characteristics and a thickness of the material forming said skirt, such sufficient so that~~ said compression step develops a radial force of said elastomeric material greater than a local resistance of said skirt to deformation by radial expansion.

181. (currently amended) The method according to claim 158, wherein said slide is one of i) metallic and made from and ii) formed of an elastomeric with a hardness greater than a hardness of the expandable punch.

182. (previously presented) The method according to claim 158, wherein said slide has a shoulder with a width equal to at least a thickness E_p of the substantially cylindrical part of said outer skirt, so that said shoulder axially compresses an end of said outer skirt when said slide is at a bottom dead center

in order to facilitate said expanded part being forced into contact with the inner wall of said cavity.

183. (previously presented) The method according to claim 158, wherein said expandable punch and said radial cavity are configured such that said radially expanded part and said substantially cylindrical part of said outer skirt have substantially the same thickness E_p .

184. (previously presented) The method according to claim 158, wherein the radial cavity of said shaping die has a geometry configured so as to obtain said radially expanded part with the second height H_2 at least equal to 2 mm and said first diameter D_1 varying from 15 mm to 60 mm.

185. (previously presented) The method according to claim 184, wherein the radial cavity of said shaping die has a geometry configured so as to obtain said radially expanded part with height H_2 varying from 3 to 15 mm, said diameter D_1 varying from 15 mm to 60 mm.

186. (previously presented) The method according to claim 158, wherein said expandable punch and said radial cavity are configured such that a ratio D_2/D_1 varies from 1.02 to 1.15.

187. (previously presented) The method according to claim 186, wherein said expandable punch and said radial cavity are configured such that the ratio D2/D1 varies from 1.05 to 1.10.

188. (previously presented) The method according to claim 158, wherein said radial cavity is configured such that said substantially cylindrical part and said expanded part are connected by at least one intermediate part with an average slope equal to $\Delta D/\Delta H$, where ΔD is equal to $D_2 - D_1$ and ΔH is equal to a height of said shell on which said diameter varies from D_1 to D_2 , said slope varying from 0.5 to 2.

189. (previously presented) The method according to claim 158, wherein said radial cavity is configured such that said radially expanded part and said substantially cylindrical part have profiles connected together by a radius of curvature R2 varying from 1.5 mm to $\Delta D/2$, where ΔD is equal to $D_2 - D_1$.

190. (previously presented) The method according to claim 158, wherein said radial cavity is configured such that an upper part of said radially expanded part is adjacent to said outer head and an upper part of said radially expanded part is adjacent to said substantially cylindrical part of said outer skirt, a profile of said outer head being connected to the profile of said radially expanded part by a radius of curvature R1 varying from 1.5 mm to 5 mm.

191. (previously presented) The method according to claim 158, wherein said radial cavity is configured such that the profile of said radially expanded part forms a circle over all or part of the height H2.

192. (previously presented) The method according to claim 158, wherein said radial cavity is configured such that said outer skirt forms a surface of revolution over all or part of the height H with a constant radius.

193. (previously presented) The method according to claim 158, wherein said radial cavity is configured such that said radially expanded part has a non-circular section in a plane perpendicular to the axial direction so as to facilitate gripping and manual rotation of said capsule.

194. (previously presented) The method according to claim 158, wherein said radial cavity is configured such that said radially expanded part has a circular section in a plane perpendicular to the axial direction with a plurality of reliefs or indentations formed on said circular section.

195. (previously presented) The method according to claim 158, wherein said radial cavity is configured such that said shell comprises said outer skirt with a cylindrical part comprising

a plurality of low amplitude deformations that can form patterns that contribute to manual gripping of the capsule.

196. (previously presented) The method according to claim 158, further comprising:

assembling an insert to said shell, said insert having an inner skirt, by depositing an adhesive onto said cylindrical part, and then force-fitting said inner skirt into said outer skirt.

197. (previously presented) The method according to claim 158, wherein said slide comprises an elastomeric or rubber lower part with a Shore A hardness greater than a hardness of said expandable punch.

198. (previously presented) The method according to claim 158, wherein said radial cavity is configured such that the profile of said radially expanded part forms a regular polygon with N sides, where N varies from 5 to 18, over all or part of the height H2.

199. (previously presented) The method according to claim 158, wherein said radial cavity is configured such that said outer skirt forms a surface of revolution over all or part of the height H with a variable radius.

200. (previously presented) The method according to claim 158, wherein said radial cavity is configured such that said outer skirt has a symmetry of rotation with angle $360^\circ/N$ where N varies from 4 to 80.